RED SEAL

THE INTERPROVINCIAL STANDARDS RED SEAL PROGRAM

National Occupational Analysis

2010 | Tilesetter

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Canada

Occupational Analyses Series

Tilesetter

2010

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FOREWORD

The Canadian Council of Directors of Apprenticeship (CCDA) recognizes this National Occupational Analysis as the national standard for the occupation of tilesetter.

Background

The first National Conference on Apprenticeship in Trades and Industries, held in Ottawa in 1952, recommended that the federal government be requested to cooperate with provincial and territorial apprenticeship committees and officials in preparing analyses of a number of skilled occupations. To this end, Human Resources and Skills Development Canada (HRSDC) sponsors a program, under the guidance of the CCDA, to develop a series of National Occupational Analyses (NOA).

The NOAs have the following objectives:

- to describe and group the tasks performed by skilled workers;
- to identify which tasks are performed in every province and territory;
- to develop instruments for use in the preparation of Interprovincial Red Seal Examinations and curricula for training leading to the certification of skilled workers;
- to facilitate the mobility of apprentices and skilled workers in Canada; and
- to supply employers, employees, associations, industries, training institutions and governments with analyses of occupations.

ACKNOWLEDGEMENTS

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This analysis was prepared by the Workplace Partnerships Directorate of HRSDC. The coordinating, facilitating and processing of this analysis were undertaken by employees of the NOA development team of the Trades and Apprenticeship Division. Carl Geoffroy for the host jurisdiction of Quebec also participated in the development of this NOA.

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LIST OF PUBLISHED NATIONAL OCCUPATIONAL ANALYSES (Red Seal Trades)

TITLE	NOC* Code
Agricultural Equipment Technician (2007)	7312
Appliance Service Technician (2005)	7332
Automotive Painter (2009)	7322
Automotive Service Technician (2009)	7321
Baker (2006)	6252
Boilermaker (2008)	7262
Bricklayer (2007)	7281
Cabinetmaker (2007)	7272
Carpenter (2010)	7271
Concrete Finisher (2006)	7282
Construction Craft Worker (2009)	7611
Construction Electrician (2008)	7241
Cook (2008)	6242
Electrical Rewind Mechanic (1999)	7333
Electronics Technician – Consumer Products (1997)	2242
Floorcovering Installer (2005)	7295
Glazier (2008)	7292
Hairstylist (2009)	6271
Heavy Duty Equipment Technician (2009)	7312
Industrial Electrician (2008)	7242
Industrial Mechanic (Millwright) (2009)	7311
Instrumentation and Control Technician (2010)	2243
Insulator (Heat and Frost) (2007)	7293
Ironworker (Generalist) (2006)	7264
Ironworker (Reinforcing) (2006)	7264
Ironworker (Structural/Ornamental) (2006)	7264
Landscape Horticulturist (2010)	2225
Lather (Interior Systems Mechanic) (2007)	7284

* National Occupational Classification

TITLE	NOC* Code
Machinist (2010)	7231
Metal Fabricator (Fitter) (2008)	7263
Mobile Crane Operator (2009)	7371
Motorcycle Mechanic (2006)	7334
Motor Vehicle Body Repairer (Metal and Paint) (2010)	7322
Oil Burner Mechanic (2006)	7331
Painter and Decorator (2007)	7294
Partsperson (2010)	1472
Plumber (2008)	7251
Powerline Technician (2009)	7244
Recreation Vehicle Service Technician (2006)	7383
Refrigeration and Air Conditioning Mechanic (2009)	7313
Rig Technician (2008)	8232
Roofer (2006)	7291
Sheet Metal Worker (2010)	7261
Sprinkler System Installer (2009)	7252
Steamfitter/Pipefitter (2010)	7252
Tilesetter (2010)	7283
Tool and Die Maker (2005)	7232
Transport Trailer Technician (2008)	7321
Truck and Transport Mechanic (2010)	7321
Welder (2009)	7265

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Gatineau, Quebec K1A 0J9

These publications can be ordered or downloaded online at: www.red-seal.ca. Links to Essential Skills Profiles for some of these trades are also available on this website.

STRUCTURE OF ANALYSIS

To facilitate understanding of the occupation, the work performed by tradespersons is divided into the following categories:

Blocks	the largest division within the analysis that is comprised of a distinct set of trade activities
Tasks	distinct actions that describe the activities within a block
Sub-Tasks	distinct actions that describe the activities within a task
Key Competencies	activities that a person should be able to do in order to be called competent in the trade

The analysis also provides the following information:

Trends	changes identified that impact or will impact the trade, including work practices, technological advances, and new materials and equipment
Related Components	a list of products, items, materials and other elements relevant to the block
Tools and Equipment	categories of tools and equipment used to perform all tasks in the block; these tools and equipment are listed in Appendix A
Context	information to clarify the intent and meaning of tasks
Required Knowledge	the elements of knowledge that an individual must acquire to adequately perform a task

The appendices located at the end of the analysis are described as follows:

Appendix A — Tools and Equipment	a non-exhaustive list of tools and equipment used in this trade
Appendix B — Glossary	definitions or explanations of selected technical terms used in the analysis
Appendix C — Acronyms	a list of acronyms used in the analysis with their full name
Appendix D — Block and Task Weighting	the block and task percentages submitted by each jurisdiction, and the national averages of these percentages; these national averages determine the number of questions for each block and task in the Interprovincial exam
Appendix E — Pie Chart	a graph which depicts the national percentages of exam questions assigned to blocks
Appendix F — Task Profile Chart	a chart which outlines graphically the blocks, tasks and sub-tasks of this analysis

DEVELOPMENT AND VALIDATION OF ANALYSIS

Development of Analysis

A draft analysis is developed by a committee of industry experts in the field led by a team of facilitators from Human Resources and Skills Development Canada. This draft analysis breaks down all the tasks performed in the occupation and describes the knowledge and abilities required for a tradesperson to demonstrate competence in the trade.

Draft Review

The National Occupational Analysis (NOA) development team then forwards a copy of the analysis and its translation to provincial and territorial authorities for a review of its content and structure. Their recommendations are assessed and incorporated into the analysis.

Validation and Weighting

The analysis is sent to all provinces and territories for validation and weighting. Participating jurisdictions consult with industry to validate and weight the document, examining the blocks, tasks and sub-tasks of the analysis as follows:

BLOCKS	Each jurisdiction assigns a percentage of questions to each block for an examination that would cover the entire trade.
TASKS	Each jurisdiction assigns a percentage of exam questions to each task within a block.
SUB-TASKS	Each jurisdiction indicates, with a YES or NO, whether or not each sub-task is performed by skilled workers within the occupation in its jurisdiction.

The results of this exercise are submitted to the NOA development team who then analyzes the data and incorporates it into the document. The NOA provides the individual jurisdictional validation results as well as the national averages of all responses. The national averages for block and task weighting guide the Interprovincial Red Seal Examination plan for the trade.

This method for the validation of the NOA also identifies common core sub-tasks across Canada for the occupation. If at least 70% of the responding jurisdictions perform a sub-task, it shall be considered common core. Interprovincial Red Seal Examinations are based on the common core sub-tasks identified through this validation process.

Definitions for Validation and Weighting

YES	sub-task performed by qualified workers in the occupation in a specific jurisdiction
NO	sub-task not performed by qualified workers in the occupation in a specific jurisdiction
NV	analysis Not Validated by a province/territory
ND	trade Not Designated in a province/territory
NOT COMMON CORE (NCC)	sub-task, task or block performed by less than 70% of responding jurisdictions; these will not be tested by the Interprovincial Red Seal Examination for the trade
NATIONAL AVERAGE %	average percentage of questions assigned to each block and task in Interprovincial Red Seal Examination for the trade

Provincial/Territorial Abbreviations

NL	Newfoundland and Labrador
NS	Nova Scotia
PE	Prince Edward Island
NB	New Brunswick
QC	Quebec
ON	Ontario
MB	Manitoba
SK	Saskatchewan
AB	Alberta
BC	British Columbia
NT	Northwest Territories
YT	Yukon Territory
NU	Nunavut

ANALYSIS

SAFETY

Safe working procedures and conditions, accident prevention, and the preservation of health are of primary importance to industry in Canada. These responsibilities are shared and require the joint efforts of government, employers and employees. It is imperative that all parties become aware of circumstances that may lead to injury or harm. Safe learning experiences and work environments can be created by controlling the variables and behaviours that may contribute to accidents or injury.

It is generally recognized that safety-conscious attitudes and work practices contribute to a healthy, safe and accident-free work environment.

It is imperative to apply and be familiar with the Occupational Health and Safety (OH&S) Acts and Workplace Hazardous Materials Information System (WHMIS) Regulations. As well, it is essential to determine workplace hazards and take measures to protect oneself, co-workers, the public and the environment.

Safety education is an integral part of training in all jurisdictions. As safety is an imperative part of all trades, it is assumed and therefore it is not included as a qualifier of any activities. However, the technical safety tasks and sub-tasks specific to the trade are included in this analysis.

SCOPE OF THE TILESETTER TRADE

"Tilesetter" is the trade's official Red Seal occupational title approved by the CCDA. This analysis covers tasks performed by tilesetters whose occupational title has been identified by provinces and territories of Canada under the following names:

	NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
Terrazzo, Tile and Marble Craft						✓							
Tilesetter	✓	✓	✓		✓			✓	✓	✓			

Tilesetters cover, protect, repair and decorate exterior and interior walls, floors, ceilings, fireplaces, swimming pools, saunas, showers and other surfaces. Tiling materials include ceramic, mosaics, glass, quarry tiles, slate, engineered stone, terrazzo, porcelain and marble or granite slabs.

Tilesetters read and interpret architectural drawings and material specifications to determine tile layout, finish and installation requirements. They may also design patterns for the area to be tiled. They prepare surfaces for tiling which may involve applying a variety of products such as membranes, mortar beds and underlayments. They select, mix, apply and spread mortar, cement, mastic, epoxy or other adhesives to the surface to be tiled. They cut and fit tiles to a variety of surfaces and finish tiles using grout. Tilesetters may also lay and set mosaic tiles to create decorative wall, mural and floor designs. Some tilesetters cut, polish and install marble and granite which may involve setting stone mechanically. They may also mix, lay, grind and polish terrazzo surfaces. Tilesetters may install marble using plaster and wire methods.

Tilesetters use special hand and power tools like tile cutters and saws to cut tiles to the correct size. Hand tools such as trowels are used to apply setting materials to fasten tiles to a surface. Levels, squares, straight edges and grid lines are used to align and straighten tiles. Grinding and polishing machines are used for finishing certain surfaces. Heavy equipment such as cranes may be used to transport and install product. Industrial mixers and pumps may be used in various installation processes.

Tilesetters may be employed by companies working in the residential, commercial and institutional field. Tilesetters may work in the private sector, in a union or be self-employed. Tilesetters often work with designers, clients, architects, suppliers and manufacturers.

Tilesetters generally work indoors. Some work such as cladding and swimming pools may be performed outside, exposing workers to inclement weather. The work can be physically demanding, requiring bending, kneeling, reaching, heavy lifting and working at heights.

Some important attributes in this trade include a good knowledge of mathematics to calculate weights and angles, wall and ceiling measurements, and the amount of material required to complete the work. The ability to read blueprints, shop drawings and specifications is also important. Planning and visual skills are needed in the design stage. Tilesetters are required to have a good eye for colour and layout, since they may prearrange tiles to confirm a specific design. Aptitudes include manual and spatial dexterity, eye-hand co-ordination and good balance and vision. Good communication and interpersonal skills are also important.

This analysis recognizes similarities with the work of bricklayers, stone masons, plasterers, drywall installers, floor covering installers and carpenters. Experienced tilesetters may advance to foreperson, instructor or supervisory positions.

OCCUPATIONAL OBSERVATIONS

The preferences for tiling materials used on jobs are changing. There is a decrease in the use of ceramic tile as porcelain, stone and glass tile are becoming more popular. Projects requiring a combination of glass and stone are being requested more often. The increased use of large format stone and tile has consequences such as the capacity of saws and cutters required to complete the work. Therefore, larger cutting tools are being introduced on the market.

Work time has increased due to many factors such as complexity of design, environmental and safety concerns, and engineered products. Advances in materials such as engineered backer boards, heat cables and shower systems continue to facilitate installation and optimize performance. Waterproofing systems are being introduced to eliminate water damage and allowing for easier and quicker installation. Laser tools are becoming more popular since they are easier to use than traditional tools.

Epoxy terrazzo's unique, smooth, seamless and durable surface is becoming more popular due to hygiene concerns in hospitals, restaurants and schools. New dustless mortars are making their way into the market due to health concerns. New setting materials are being introduced to simplify the installation process done by tilesetters and to meet more stringent environmental standards.

ESSENTIAL SKILLS SUMMARY

Essential skills are needed for work, learning and life. They provide the foundation for learning all other skills and enable people to evolve with their jobs and adapt to workplace change.

Through extensive research, the Government of Canada and other national and international agencies have identified and validated nine essential skills. These skills are used in nearly every occupation and throughout daily life in different ways.

A series of CCDA-endorsed tools have been developed to support apprentices in their training and to be better prepared for a career in the trades. The tools can be used independently or with the assistance of a tradesperson, trainer, employer, teacher or mentor to:

- understand how essential skills are used in the trades;
- learn about individual essential skills strengths and areas for improvement; and
- improve essential skills and increase success in an apprenticeship program.

The tools are available online or for order at: www.hrsdc.gc.ca/essentialskills

The essential skills profile for the tilesetter trade indicates that the most important essential skills are **document use, problem solving and job task planning and organizing**.

The application of these skills may be described throughout this document within the competency statements which support each sub-task of the trade. The following are summaries of the requirements in each of the essential skills, taken from the essential skills profile. A link to the complete essential skills profile can be found at www.red-seal.ca.

Reading
Tilesetters require strong reading skills to read instructions and specification guides on installation procedures and the most effective way to use or apply a product. Tilesetters read work orders to learn about specific client requests and instructions from co-workers and forepersons to coordinate work activities.

Document Use
Tilesetters interpret shop drawings and blueprints to calculate measurements and determine pattern layout. Tilesetters also refer to provincial building codes and industry resources.

Writing
Tilesetters use wr..ng skills to prepare work orders, timesheets and instructions for co-workers to co-ordinate work. They may keep personal logbooks on the details and status of tasks performed. On occasion, tilesetters may need to complete hazard or near-miss reports.

Oral Communication
Tilesetters interact with supervisors to receive directions and assignments. They communicate with co-workers, other trades and customers to coordinate work and schedule activities. Tilesetters may instruct apprentices and speak with suppliers when ordering product.

Numeracy
Tilesetters measure and calculate product quantities taking into consideration factors such as slopes, curves and pattern layout. They calculate mix ratios and convert measurements between imperial and metric systems.

Thinking Skills
Tilesetters often have to use thinking skills to resolve problems like laying tile in rooms that are not square. They make decisions regarding the best way to complete a job and then plan and organize the implementation of that work. Tilesetters keep track of priorities, safety considerations, client instructions and job-specific installation details.

Working with Others
Tilesetters can work independently, as part of a team on larger projects or with an apprentice. They coordinate projects with co-workers and other trades. Tilesetters also maintain close contact with supervisors, forepersons and clients to discuss job details, address problems and perform quality control checks.

Computer Use
Tilesetters may use computer software to design layouts, communicate with clients, for research, and develop work orders and other documentation.

Continuous Learning
Technical upgrading is offered by some manufacturers when new products or equipment are introduced. Provincial construction associations offer safety training courses. Tilesetters may upgrade or develop new skills through various means such as working with more experienced tilesetters or supervisors.

BLOCK A — OCCUPATIONAL SKILLS

Trends

Occupational safety is the greatest concern. Leadership in Energy and Environmental Design (LEED) is now being taken into consideration when estimating and ordering materials. Technological advances enable tilesetters to estimate materials and supplies in a quick and concise manner through automated systems. Training and certification for use of materials and equipment is on the rise.

Related Components

All components apply.

Tools and Equipment

See Appendix A.

Context

Tilesetters integrate safety practices throughout every task included in the scope of their trade. They maintain a safe work environment through the maintenance and use of their tools, equipment and materials. Tilesetters sometimes use scaffolding and access, rigging, hoisting and lifting equipment to complete their job. With experience, tilesetters develop the ability to evaluate damages and deficiencies through accurate assessment. They demonstrate organizational skills to ensure the project's successful development from start to finish.

Task 1 — Performs safety-related functions.

Required Knowledge

K 1	OH&S
K 2	jurisdictional safety regulations
K 3	dangerous conditions and potential hazards
K 4	types and usage of personal protective equipment (PPE)
K 5	types and usage of safety equipment
K 6	required training and certification
K 7	WHMIS and Material Safety Data Sheets (MSDS)
K 8	first aid
K 9	safety protocol
K 10	company safety policy

K 11	signage
K 12	required ventilation

Sub-task

A-1.01 **Maintains safe work environment.**

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
NV	yes	yes	yes	yes	yes	ND	yes	yes	yes	ND	ND	ND

Key Competencies

A-1.01.01	identify and correct potential and existing hazards
A-1.01.02	maintain clean work area
A-1.01.03	acknowledge and inform surrounding co-workers concerning safety and wellbeing
A-1.01.04	set up barricading devices and signage such as caution tape, fences and barriers to define work perimeters and contain contaminants or other hazards
A-1.01.05	safely store materials and equipment
A-1.01.06	dispose of materials and products according to jurisdictional regulations and MSDS
A-1.01.07	identify and respect physical limitations of self and others
A-1.01.08	set up or identify location of safety zone containing components such as first aid kit, WHMIS, fire extinguishers, MSDS and eye wash stations
A-1.01.09	document items such as inspections, potential hazards, safety meetings, injuries and training according to jurisdictional regulations

Sub-task

A-1.02 **Uses personal protective equipment (PPE) and safety equipment.**

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
NV	yes	yes	yes	yes	yes	ND	yes	yes	yes	ND	ND	ND

Key Competencies

A-1.02.01	identify site hazards and regulations requiring the use of PPE and safety equipment
A-1.02.02	select PPE and safety equipment appropriate for individual tasks and situations
A-1.02.03	maintain and store PPE and safety equipment
A-1.02.04	apply local, provincial and national safety regulations such as WHMIS and OH&S
A-1.02.05	identify PPE damage such as excessively worn boots, worn harnesses and cracked safety glasses
A-1.02.06	recognize CSA-approved PPE and applicable safety equipment such as fire extinguishers and barricades
A-1.02.07	ensure proper fit of PPE such as respirators, fall arrest harnesses and face shields
A-1.02.08	report and replace damaged or faulty equipment

Task 2 Uses and maintains tools and equipment.

Required Knowledge

K 1	types and safe uses of hand and power tools according to manufacturers' recommendations
K 2	maintenance procedures of hand and power tools
K 3	types and uses of air, electric and hydraulic power tools
K 4	power tool components such as guards, handles and cords
K 5	types and uses of scaffolding and access equipment such as ramps, stairs and elevating work platforms
K 6	components of scaffolding
K 7	operating procedures for scaffolding and access equipment
K 8	manufacturers' recommended uses, limitations and maintenance of scaffolding

K 9	types and uses of hoisting and lifting equipment
K 10	types and uses of rigging equipment such as belts, ropes, cables and slings
K 11	procedures for setup and use of rigging, hoisting and lifting equipment

---

Sub-task

A-2.01 **Maintains tools and equipment.**

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
NV	yes	yes	yes	yes	yes	ND	yes	yes	yes	ND	ND	ND

Key Competencies

A-2.01.01	inspect tools and equipment for deficiency or damage
A-2.01.02	repair or replace defective or damaged tools and equipment according to manufacturers' specifications
A-2.01.03	clean and store tools and equipment according to manufacturers' specifications
A-2.01.04	document tool and equipment maintenance
A-2.01.05	recognize worn, damaged and defective tools, and tag and remove from service if necessary

---

Sub-task

A-2.02 **Uses access equipment.**

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
NV	yes	yes	yes	yes	yes	ND	yes	yes	yes	ND	ND	ND

Key Competencies

A-2.02.01	select access equipment for the job taking into consideration size, site conditions and task being performed
A-2.02.02	inspect access equipment for damage and missing components, and tag and remove from service if required
A-2.02.03	identify hazards such as excess loads when erecting access equipment
A-2.02.04	secure access equipment

A-2.02.05	erect, level and dismantle access equipment according to jurisdictional regulations
A-2.02.06	use equipment within operating limitations as indicated on manufacturers' tags and in compliance with OH&S regulations

---

Sub-task

A-2.03 **Uses rigging, hoisting and lifting equipment.**

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
NV	yes	yes	yes	yes	yes	ND	yes	yes	yes	ND	ND	ND

Key Competencies

A-2.03.01	inspect hoisting, rigging and lifting equipment before and after use
A-2.03.02	select rigging equipment such as shackles, spreader bars and chain hoists according to task and load size and capacities
A-2.03.03	recognize worn, damaged or defective hoisting and rigging equipment and remove from service
A-2.03.04	lubricate hoisting equipment such as chain falls and gin wheels
A-2.03.05	locate centre of gravity of load
A-2.03.06	secure load to rigging using techniques such as choking, and using shackles and lifting clamps
A-2.03.07	communicate with personnel involved in lift using methods such as hand signals and two-way radios
A-2.03.08	store hoisting and rigging equipment in secure, clean and dry environment
A-2.03.09	restrict access to lift area to prevent injury and damage using items such as signs, barricades and danger/caution tape

---

Task 3 Organizes work.

Required Knowledge

K 1	environmental requirements of work to be conducted such as minimum temperature and humidity for interior and exterior projects
K 2	substrate suitability
K 3	project schedule
K 4	demolition techniques, and waste removal and disposal

K 5	impacts of work on surrounding areas
K 6	dust barriers, hoarding and temporary barrier requirements
K 7	safety codes applicable to work site
K 8	required materials and supplies
K 9	inventory control
K 10	imperial and metric conversions
K 11	storage of materials and supplies on site to ensure security and ease of use
K 12	sequence of materials to be used
K 13	sequence of work
K 14	requirements of other trades on site
K 15	methods for securing and protecting materials

Sub-task

A-3.01 Estimates materials, supplies and labour.

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
NV	yes	yes	yes	yes	yes	ND	yes	yes	no	ND	ND	ND

Key Competencies

A-3.01.01	measure job dimensions including length, width and height
A-3.01.02	convert imperial and metric measurements if required
A-3.01.03	select required materials and supplies
A-3.01.04	determine if special equipment is required
A-3.01.05	calculate quantities of materials and supplies according to pattern or design
A-3.01.06	estimate timeframe for completion of job
A-3.01.07	identify surrounding issues such as elevations, protections, obstructions and utilities
A-3.01.08	determine suitability of product to be used for project
A-3.01.09	inquire on availability of materials

Sub-task

A-3.02 **Organizes materials, supplies and work site.**

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
NV	yes	yes	yes	yes	yes	ND	yes	yes	yes	ND	ND	ND

Key Competencies

A-3.02.01	order materials and supplies
A-3.02.02	collect materials and supplies
A-3.02.03	store and secure materials and supplies on site according to manufacturers' specifications
A-3.02.04	schedule work to be performed
A-3.02.05	assess site readiness
A-3.02.06	pre-clean and remove obstructions from work site
A-3.02.07	install dust barriers, hoarding and temporary barriers to protect surrounding finishes
A-3.02.08	install inclement weather protection such as tents, covers and heaters
A-3.02.09	take remedial action for problems such as missing materials, unavailable utilities and unsuitable temperature
A-3.02.10	determine availability of auxiliary work spaces such as mixing, storage and cutting areas

Sub-task

A-3.03 **Evaluates damage or deficiencies.**

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
NV	yes	yes	yes	yes	yes	ND	yes	yes	yes	ND	ND	ND

Key Competencies

A-3.03.01	select and use tools and equipment such as hammer, chisel, knife and vacuum
A-3.03.02	inspect visually for damage or deficiencies such as cracks, discolouration and spawling
A-3.03.03	remove damaged components if required
A-3.03.04	determine probable root cause of damage or deficiencies
A-3.03.05	confirm evaluation of root cause with consultants such as engineers and architects if required

BLOCK B — SUBSTRATE PREPARATION

Trends

Sound barriers are following in-floor heating in popularity and are now mandatory in some buildings. Installation methods for in-floor heating and sound barriers are becoming easier due to advanced technology. Product and material compositions are changing to increase efficiency. Recycling of removed materials is compulsory in some jurisdictions and is being enforced in more and more regions. The LEED program is beginning to influence the development of installation materials to meet environmental standards.

Related Components (include, but not limited to)

Membranes (cleavage, isolation, waterproof, sound barriers and drainage mats), sand, cement, thinset, epoxy primer, acrylic, water, polyurethane sheet, wire mesh, tile backer board, extruded polystyrene benches, trays and curbs, and cable or mat in-floor heating products.

Tools and Equipment

See Appendix A.

Context

Substrate preparation is a key step of a finished tile, stone or terrazzo project. It ensures the ease in subsequent procedures and the longevity of the finished product. Tilesetters determine and evaluate the conditions of the substrate for deficiencies such as cracks, holes and deterioration and prepare the surface accordingly. In renovations, tilesetters may remove existing coverings before this evaluation. Substrate preparation may also involve the installation of specialty products such as sound barriers, in-floor heating and engineered products. Engineered products are prefabricated products that enhance the installation and performance of the substrate and tile.

Task 4 — Removes existing finishes.

Required Knowledge

K 1	existing material to be removed
K 2	properties of material to be removed
K 3	environmental laws
K 4	types of substrate contaminates
K 5	substrate contaminates removal methods

K 6	surface-ready substrate
K 7	surrounding floor elevations
K8	structural integrity of substrate

Sub-task

B-4.01 **Removes surface coverings.**

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
NV	yes	yes	yes	yes	yes	ND	yes	yes	yes	ND	ND	ND

Key Competencies

B-4.01.01	select and use tools and equipment such as hammer, chisel, jackhammer, scraper and pry bars
B-4.01.02	determine which existing surface coverings must be removed such as carpet, old tile, wall paper and particle board
B-4.01.03	cover surrounding areas and items to protect from dust and debris
B-4.01.04	remove items such as appliances and furniture restricting access to work area
B-4.01.05	remove hardware such as towel bars and trim kits from work area where permitted
B-4.01.06	strip existing surface coverings using methods such as jackhammering, scraping, chiselling or prying while minimizing damage
B-4.01.07	dispose of removed surface coverings according to environmental laws

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Sub-task

B-4.02 **Cleans surfaces.**

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
NV	yes	yes	yes	yes	yes	ND	yes	yes	yes	ND	ND	ND

Key Competencies

B-4.02.01	select and use tools and equipment such as vacuum, broom, mop, shot blaster and sponges
B-4.02.02	identify contaminants such as mould and asbestos, and take appropriate action according to jurisdictional regulations
B-4.02.03	sweep up and remove large debris according to environmental laws

B-4.02.04	vacuum fine debris such as dust and residue
B-4.02.05	wash solvent-based materials with chemical cleaners according to manufacturers' specifications
B-4.02.06	wipe surfaces with a mop or sponge as required
B-4.02.07	remove and dispose of contaminants according to environmental laws

Task 5 — Evaluates and prepares surface.

Required Knowledge

K 1	properties of substrate
K 2	substrate repair methods
K 3	types of membranes such as waterproof and crack isolation
K 4	types of reinforcement mesh and wire
K 5	mortar bed installation
K 6	finished elevations
K 7	types of underlayments such as exterior grade plywood, cement board and self leveller
K 8	underlay installation methods
K 9	bond coats
K 10	TTMAC specifications

Sub-task

B-5.01 Assesses existing substrate.

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
NV	yes	yes	yes	yes	yes	ND	yes	yes	yes	ND	ND	ND

Key Competencies

B-5.01.01	select and use tools and equipment such as straight edge, levels and tape measure
B-5.01.02	establish high and low points of substrate
B-5.01.03	identify deflection in substrates
B-5.01.04	ensure backing is in place for accessories such as grab bars, inserts and dispensers if required

B-5.01.05	diagnose damage or deficiencies such as seasonal cracks, deterioration and holes
B-5.01.06	determine method of repair

Sub-task

B-5.02 Installs membranes.

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
NV	yes	yes	yes	yes	yes	ND	yes	yes	yes	ND	ND	ND

Key Competencies

B-5.02.01	select and use tools and equipment such as trowel and roller
B-5.02.02	select membrane according to conditions such as humidity and stability
B-5.02.03	apply membrane according to manufacturers' specifications using methods such as trowelling, rolling and loose lay

---

Sub-task

B-5.03 Installs mortar beds.

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
NV	yes	yes	yes	yes	yes	ND	yes	yes	yes	ND	ND	ND

Key Competencies

B-5.03.01	select and use tools and equipment such as straight edge, hawk and float
B-5.03.02	attach reinforcement such as wire mesh and expanded metal lath as required
B-5.03.03	apply slurry bond coat on surface as required
B-5.03.04	apply scratch coat on walls as required
B-5.03.05	apply mortar screed for levelling, squaring and drainage purposes according to manufacturers' specifications and as required

Sub-task

B-5.04 **Installs underlayments.**

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
NV	yes	yes	yes	yes	yes	ND	yes	yes	yes	ND	ND	ND

Key Competencies

B-5.04.01	select and use tools and equipment such as straight edge, drill and saw
B-5.04.02	select underlayment according to conditions such as unevenness and deflection
B-5.04.03	apply underlayment according to manufacturers' specifications using methods such as screwing, trowelling and placing

Task 6 Installs specialty products.

Required Knowledge

K 1	sound barrier products
K 2	suitability of sound barrier products
K 3	in-floor heating products
K 4	suitability of in-floor heating products
K 5	limitations and trade restrictions related to components such as structural, electrical and plumbing installations
K 6	types of engineered products such as prefabricated shower curbs and niches, lightweight columns, and ultra-lightweight waterproof wallboards
K 7	suitability of engineered products
K 8	TTMAC specifications

Sub-task

B-6.01 **Installs sound barrier products.**

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
NV	yes	yes	yes	yes	yes	ND	yes	yes	yes	ND	ND	ND

Key Competencies

B-6.01.01	select sound barrier according to specifications or customer requirements
B-6.01.02	select and use tools and equipment such as roller, drill and trowel
B-6.01.03	place sound barrier using methods such as peel and stick, trowel and loose lay according to manufacturers' specifications

Sub-task

B-6.02 **Installs in-floor heating.**

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
NV	yes	yes	yes	yes	yes	ND	yes	yes	yes	ND	ND	ND

Key Competencies

B-6.02.01	select in-floor heating according to conditions such as size of area
B-6.02.02	select and use tools and equipment such as trowel, hammer and hot glue gun
B-6.02.03	place in-floor heating using trowel-in or mechanical fastening according to manufacturers' specifications and jurisdictional regulations

Sub-task

B-6.03 **Installs engineered products.**

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
NV	yes	yes	yes	yes	yes	ND	yes	yes	yes	ND	ND	ND

Key Competencies

B-6.03.01	select engineered product according to customer specifications
B-6.03.02	select and use tools and equipment such as drill, knife, saw and trowel
B-6.03.03	ensure area is dry and clean

B-6.03.04	determine placement of engineered product according to manufacturers' specifications
B-6.03.05	cut engineered product to suit area if required
B-6.03.06	place engineered product using methods such as trowelling and loose lay according to manufacturers' specifications
B-6.03.07	ensure adherence of engineered product to substrate if required

BLOCK C — LAYOUTS

Trends	A wider range of products such as large format tile are available which influence the tile layout. The complexity of layouts is increasing due to unlimited colours and endless design possibilities of mosaic tile and digital designs.
Related Components	Not applicable.
Tools and Equipment	See Appendix A.
Context	Layout involves the activities required before the actual installation of the tile, stone and terrazzo. It ensures that proper installation and visual appearance of the finished material is in accordance with the design specifications.

Task 7 — Lays out work area.

Required Knowledge

K 1	metric and imperial measurements
K 2	procedures for squaring area
K 3	geometric and design shapes
K 4	layout principles and procedures
K 5	project specifications such as design and shop drawings, specifications and blueprints
K 6	standards related to height and depth of stairs
K 7	construction geometry
K 8	standards related to joint widths and minimum requirements
K 9	type and location of expansion and control joints
K 10	composition of materials
K 11	impact of environmental conditions
K 12	building code
K 13	TTMAC specifications

Sub-task

C-7.01 **Confirms site measurements.**

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
NV	yes	yes	yes	yes	yes	ND	yes	yes	yes	ND	ND	ND

Key Competencies

C-7.01.01	select and use tools and equipment such as tape measure, framing square, levels, straight edge and plumb bob
C-7.01.02	ensure work area matches design specifications
C-7.01.03	ensure elevations of floor and walls are in accordance with design specifications
C-7.01.04	ensure transitions surrounding finishing materials meet design specifications
C-7.01.05	ensure size openings are in accordance with design specifications
C-7.01.06	verify marked grid lines and elevations are in accordance with design specifications
C-7.01.07	assess if work area meets building code relating to handicap accessibility

Sub-task

C-7.02 **Determines tile layout for best visual effect.**

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
NV	yes	yes	yes	yes	yes	ND	yes	yes	yes	ND	ND	ND

Key Competencies

C-7.02.01	select and use tools and equipment such as chalk line, laser line and calculator
C-7.02.02	visualize finished design
C-7.02.03	determine grid size considering grout spacing minimums specified according to design and manufacturers' specifications
C-7.02.04	determine if work area is square or geometrically compatible with design
C-7.02.05	adapt layout to ensure work area is pleasing to untrained eye and conforms with existing surroundings and finishes
C-7.02.06	integrate trim accessories to design

Sub-task

C-7.03 **Lays out grid lines.**

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
NV	yes	yes	yes	yes	yes	ND	yes	yes	yes	ND	ND	ND

Key Competencies

C-7.03.01	select and use tools and equipment such as chalk line, laser line, builder square, straight edge and calculator
C-7.03.02	establish starting point
C-7.03.03	establish grid lines and reference points by snapping or marking them using tools such as laser line and chalk line
C-7.03.04	ensure grid remains consistent and square with design

Sub-task

C-7.04 **Evaluates rise and run of stairs.**

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
NV	yes	yes	yes	yes	yes	ND	yes	yes	yes	ND	ND	ND

Key Competencies

C-7.04.01	select and use tools and equipment such as calculator, protractor, framing square and transit
C-7.04.02	assess if stair design meets building code
C-7.04.03	verify height of risers and tread size based on finished elevations
C-7.04.04	lay out stair considering accessories such as anti-slip nosing, profiles and railings specified in design

Task 8 Evaluates joints.

Required Knowledge

K 1	types of joints such as cold, movement, control and structural
K 2	purpose of joints
K 3	TTMAC specifications

Sub-task

C-8.01 **Accommodates existing joints.**

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
NV	yes	yes	yes	yes	yes	ND	yes	yes	yes	ND	ND	ND

Key Competencies

C-8.01.01	confirm if location of existing joints match as-built
C-8.01.02	confirm if design and layout fit existing joints

Sub-task

C-8.02 **Determines additional joint requirements.**

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
NV	yes	yes	yes	yes	yes	ND	yes	yes	yes	ND	ND	ND

Key Competencies

C-8.02.01	assess if additional control joints are required to conform to design specifications, manufacturers' specifications and site conditions
C-8.02.02	calculate and identify location and incorporate into design layout

BLOCK D MATERIAL PREPARATION

Trends	There is an increase of pre-mixed materials available on the market.
Related Components (include, but not limited to)	Cement, water, tile, stone, terrazzo, epoxy, mortar, terrazzo aggregate and grout.
Tools and Equipment	See Appendix A.
Context	Material preparation encompasses the preparation of components required in advance of installing the finished product. It includes preparing the tile and stone, mixing setting and grouting materials, and preparation activities for installing terrazzo.

Task 9 Inspects materials.

Required Knowledge

K 1	calibre variations
K 2	shading variations
K 3	gauge variations
K 4	natural stone properties
K 5	different sizes of terrazzo chips
K 6	product defects such as chips, hairline cracks, damaged corners and surface defects
K 7	surface finishes
K 8	TTMAC specifications

Sub-task

D-9.01 **Confirms material consistencies.**

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
NV	yes	yes	yes	yes	yes	ND	yes	yes	yes	ND	ND	ND

Key Competencies

D-9.01.01	select and use tools and equipment such as tape measure, caliper, level and square
D-9.01.02	ensure product on-site matches specified materials and control samples
D-9.01.03	check variance in dye lot, thickness, colour and calibre

Sub-task

D-9.02 **Checks for damage.**

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
NV	yes	yes	yes	yes	yes	ND	yes	yes	yes	ND	ND	ND

Key Competencies

D-9.02.01	select and use tools and equipment such as camera and rubber mallet
D-9.02.02	visually inspect packaging for damage
D-9.02.03	spot check product for damage such as chipping, cracks and breakage
D-9.02.04	determine if damaged product is useable or needs to be returned to supplier

Task 10 Prepares material for installation.

Required Knowledge

K 1	material properties
K 2	accurate measurements and marking
K 3	tile cutting procedures
K 4	pre-cut stone slabs
K 5	polishing materials
K 6	sealing products

K 7	environmental conditions such as temperature and humidity
K 8	templating
K 9	MSDS
K 10	design
K 11	TTMAC specifications

Sub-task

D-10.01 Prepares tile.

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
NV	yes	yes	yes	yes	yes	ND	yes	yes	yes	ND	ND	ND

Key Competencies

D-10.01.01	select and use tools and equipment such as tile cutters, grinders and saws
D-10.01.02	mix tiles to ensure a uniform appearance
D-10.01.03	create templates for specialty cuts
D-10.01.04	cut tiles according to layout and design specifications
D-10.01.05	measure and cut trim products
D-10.01.06	seal product if required

Sub-task

D-10.02 Prepares stone slabs.

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
NV	yes	yes	yes	yes	yes	ND	yes	yes	yes	ND	ND	ND

Key Competencies

D-10.02.01	select and use tools and equipment such as hand grinders, saws and drills
D-10.02.02	organize slabs in order of installation
D-10.02.03	pre-drill holes if required
D-10.02.04	remove fibreglass backer if required
D-10.02.05	create template for cutting according to design
D-10.02.06	use template to cut slab

D-10.02.07	shape, edge and polish slab according to the design using tools such as routers, water polishing kit, coring bits and saws
D-10.02.08	stack slabs back to back to protect finish
D-10.02.09	install reinforcement such as rods and fasteners if required
D-10.02.10	seal product if required
D-10.02.11	resin fill if required

Task 11 Mixes materials.

Required Knowledge

K 1	types of epoxies and their specifications
K 2	MSDS
K 3	material properties
K 4	types of thinset mortars and their specifications
K 5	additives
K 6	composition of mortar beds
K 7	types of grout and their specifications
K 8	size and types of aggregate
K 9	mixing ratios
K 10	types of terrazzo and their specifications
K 11	sequence of mixing additives
K 12	TTMAC specifications
K 13	American National Standards Institute (ANSI) standards

Sub-task

D-11.01 Mixes material for tile and stone.

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
NV	yes	yes	yes	yes	yes	ND	yes	yes	yes	ND	ND	ND

Key Competencies

D-11.01.01	select and use tools and equipment such as slow speed mixer and mixing paddles
D-11.01.02	combine materials according to manufacturers' specifications
D-11.01.03	mix materials according to manufacturers' specifications

Sub-task

D-11.02 Mixes mortar beds.

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
NV	yes	yes	yes	yes	yes	ND	yes	yes	yes	ND	ND	ND

Key Competencies

D-11.02.01	select and use tools and equipment such as drum mixers, shovels, wheel barrows, rakes and measuring equipment
D-11.02.02	determine mix ratio according to application
D-11.02.03	combine dry materials according to mix ratio
D-11.02.04	confirm desired consistency and take remedial action such as adding water or acrylic if required
D-11.02.05	blend material thoroughly

Sub-task

D-11.03 **Mixes terrazzo.**

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
NV	yes	no	yes	yes	yes	ND	yes	yes	no	ND	ND	ND

Key Competencies

D-11.03.01	select and use tools and equipment such as drum mixer, slow speed mixing drills, buckets and shovels
D-11.03.02	combine aggregate as per design, specifications or control sample
D-11.03.03	blend and maintain desired consistency
D-11.03.04	combine components of desired product as per design and manufacturers' specifications
D-11.03.05	store mixed aggregate for epoxy in containers to ensure it remains dry

Trends	Due to consumer preferences, size of tiles has increased. New lightweight engineered mortars have been introduced to eliminate sagging of these large format tiles on walls and lippage on floors. This new material is more environmentally friendly than previously used organic mastic. Setting materials are being improved to meet more stringent environment standards such as volatile organic components (VOC) emission, antimicrobial control and LEED.
Related Components (include, but not limited to)	Tile, stone, terrazzo, anchors, adhesives, grout, edge profiles, terrazzo strips, thresholds, caulking, accessories (such as soap dish and towel bars), and manufactured control and expansion joints.
Tools and Equipment	See Appendix A.
Context	Tilesetting is the art of physically executing what designers and architects have designed or conceived using tile, stone slab and terrazzo. Tilesetters install tile and stone on various surfaces such as floors, walls and ceilings. Tile includes ceramic, mosaic, glass, porcelain and natural stone. Stone slabs include marble, limestone, granite, soap stone, slate stone and engineered stone.

Task 12 Installs tiles.

Required Knowledge

K 1	setting material products such as thinset mortar, medium bed, mastic, ultra light weight mortar and epoxy
K 2	setting material application techniques
K 3	environmental requirements such as temperature and humidity
K 4	types of tiles such as ceramic, porcelain, stone and quartzite
K 5	tile installation procedures and standards such as mortar bed installation and sand finish
K 6	types of accessories such as soap dishes and towel bars
K 7	product limitations

K 8	mechanical installation methods
K 9	accessory installation procedures
K 10	joint specifications
K 11	types of joints
K 12	purposes of joints
K 13	joint installation procedures
K 14	trims such as metal and plastic profiles
K 15	trim installation methods
K 16	threshold products such as stone, wood or metal
K 17	threshold installation procedures
K 18	clearances for doors
K 19	TTMAC specifications

Sub-task

E-12.01 Applies setting material.

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
NV	yes	yes	yes	yes	yes	ND	yes	yes	yes	ND	ND	ND

Key Competencies

E-12.01.01	select and use tools and equipment such as notch trowel and margin trowel
E-12.01.02	determine specific amount of material to be spread during open time taking into account factors such as environmental conditions, manufacturers' specifications and substrate type
E-12.01.03	spread setting material using various methods such as flat trowelling, back buttering and notch trowelling without covering grid lines
E-12.01.04	spot check material periodically to verify bonding properties

Sub-task

E-12.02 Sets tiles.

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
NV	yes	yes	yes	yes	yes	ND	yes	yes	yes	ND	ND	ND

Key Competencies

E-12.02.01	select and use tools and equipment such as tile cutters, nippers, saws and margin trowel
E-12.02.02	install tiles using various methods such as thinset, mortar bed and spot set to ensure ultimate bond strength
E-12.02.03	position tile using methods such as push and twist and beat in to ensure sufficient coverage
E-12.02.04	check tiles periodically to ensure sufficient setting material transfer
E-12.02.05	follow grid lines to ensure straightness and even spacing of joints
E-12.02.06	remove excess setting material
E-12.02.07	install threshold when required
E-12.02.08	ensure suitable environmental conditions such as humidity and temperature when setting tile

Sub-task

E-12.03 Installs accessories.

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
NV	yes	yes	yes	yes	yes	ND	yes	yes	yes	ND	ND	ND

Key Competencies

E-12.03.01	select and use tools and equipment such as caulking gun, hot glue gun and hammer drill
E-12.03.02	determine location of accessories according to customer specifications
E-12.03.03	determine fastening methods according to type of fixture
E-12.03.04	locate backing before installing products such as grab bars and dispensers
E-12.03.05	level and fasten fixture in place using various methods such as gluing and screwing according to manufacturers' specifications

Sub-task

E-12.04 **Installs expansion and control joints.**

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
NV	yes	yes	yes	yes	yes	ND	yes	yes	yes	ND	ND	ND

Key Competencies

E-12.04.01	select and use tools and equipment such as caulking gun, mini saw and grinder
E-12.04.02	cut mortar bed according to grid lines or patterns to incorporate control joints
E-12.04.03	place joints according to specifications
E-12.04.04	ensure that expansion and control joints are free of contaminants

Sub-task

E-12.05 **Installs tile trim.**

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
NV	yes	yes	yes	yes	yes	ND	yes	yes	yes	ND	ND	ND

Key Competencies

E-12.05.01	select and use tools and equipment such as hacksaw, snips and utility knife
E-12.05.02	cut and shape trim to length
E-12.05.03	select trim according to transition heights and adjacent materials
E-12.05.04	set and anchor trim according to manufacturers' specifications to achieve finished look

Task 13 Installs stone slabs.

Required Knowledge

K 1	drawings and specifications
K 2	building codes applicable to installation of stone slabs
K 3	anchoring products and installation methods
K 4	types of setting materials

K 5	setting material application procedures
K 6	environmental requirements such as temperature and humidity
K 7	slab installation methods
K 8	compatible material properties

Sub-task

E-13.01 Installs anchors.

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
NV	yes	no	yes	yes	yes	ND	yes	yes	yes	ND	ND	ND

Key Competencies

E-13.01.01	select and use tools and equipment such as hammer drills, grinder and ratchet set
E-13.01.02	select anchors such as T, track and wire anchors according to local building code
E-13.01.03	position and fasten anchors to slab and/or substrate

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Sub-task

E-13.02 Applies stone slab setting material.

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
NV	yes	no	yes	yes	yes	ND	yes	yes	yes	ND	ND	ND

Key Competencies

E-13.02.01	select and use tools and equipment such as margin trowel, mixer and caulking gun
E-13.02.02	ensure suitable environmental conditions such as humidity and temperature for setting stone slabs
E-13.02.03	verify that setting material is suitable for application and stone according to manufacturers' specifications
E-13.02.04	place setting material using various methods such as spreading, back buttering and spotting, ensuring sufficient amount of setting material is used for specific application

Sub-task

E-13.03 **Mounts stone slabs.**

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
NV	yes	no	yes	yes	yes	ND	yes	yes	yes	ND	ND	ND

Key Competencies

E-13.03.01	select and use tools and equipment such as rubber mallet, hammer drill and levels
E-13.03.02	position stone slab considering alignment, level and plumb using various techniques
E-13.03.03	secure slab to substrate using fasteners such as anchors and pins, and wires

Sub-task

E-13.04 **Sets stone slabs.**

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
NV	yes	no	yes	yes	yes	ND	yes	yes	yes	ND	ND	ND

Key Competencies

E-13.04.01	select and use tools and equipment such as rubber mallet, trowels and levels
E-13.04.02	position stone slab considering alignment and level, using various methods
E-13.04.03	fasten slab to substrate using applied adhesives such as epoxy, mortar and silicone
E-13.04.04	make final adjustments if required

Task 14 Pours terrazzo mixture.

Required Knowledge

K 1	terrazzo specifications
K 2	bonding agents such as epoxy and slurry bond coating
K 3	bond coat application methods
K 4	setting times
K 5	trowelling methods

K 6	types of terrazzo
K 7	material properties
K 8	environmental requirements such as temperature and humidity
K 9	types and size of terrazzo aggregates
K 10	types of materials used
K 11	divider strips placement and methods
K 12	TTMAC specifications

Sub-task

E-14.01 Installs divider strips for terrazzo.

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
NV	yes	no	yes	yes	yes	ND	yes	yes	no	ND	ND	ND

Key Competencies

E-14.01.01	select and use tools and equipment such as saws, snips and grinders
E-14.01.02	select strip according to criteria such as size of aggregate, installation methods and design specifications
E-14.01.03	measure and cut strips according to size of grid and pattern
E-14.01.04	set strips in fresh mortar bed or over cured mortar bed using various methods such as insertion and use of adhesives

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Sub-task

E-14.02 Applies bond coat.

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
NV	yes	no	yes	yes	yes	ND	yes	yes	no	ND	ND	ND

Key Competencies

E-14.02.01	select and use tools and equipment such as rollers and brushes
E-14.02.02	select bond coat according to type of terrazzo used such as slurries, latex and epoxy
E-14.02.03	ensure substrate is clean prior to applying bond coat

E-14.02.04	treat substrate prior to applying bond coat if required
E-14.02.05	place specific amount of bond coat in pre-determined area considering open time factors such as environmental conditions, manufacturers' specifications and substrate type

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Sub-task

E-14.03 Trowels in terrazzo mixture.

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
NV	yes	no	yes	yes	yes	ND	yes	yes	no	ND	ND	ND

Key Competencies

E-14.03.01	select and use tools and equipment such as trowels and shovels
E-14.03.02	pour terrazzo mixture within strip boundaries
E-14.03.03	spread terrazzo mixture using tools such as terrazzo float, magnesium trowel and base trowel, up to strip heights to ensure uniform thickness

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Sub-task

E-14.04 Works surface.

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
NV	yes	no	yes	yes	yes	ND	yes	yes	no	ND	ND	ND

Key Competencies

E-14.04.01	select and use tools and equipment such as compacting trowel and rollers
E-14.04.02	sprinkle and compact aggregate evenly if required
E-14.04.03	determine if terrazzo has set to pre-determined plastic state
E-14.04.04	hand work terrazzo until it stiffens
E-14.04.05	compact terrazzo aggregates evenly using rollers and water if required
E-14.04.06	remove excess water on surface if required
E-14.04.07	power-trowel surface if required

BLOCK F — FINISHING

Trends	Technology for finishing equipment and materials has improved. Equipment is safer, larger, lighter and faster, resulting in higher productivity for tilesetters. Equipment and materials are more environmentally friendly.
Related Components (include, but not limited to)	Sealers, grouts, terrazzo aggregate, strips, pigments, epoxy, caulking, adhesives.
Tools and Equipment	See Appendix A.
Context	Finishing is the last step of completing the installation. This step is very important since it completes the process and reveals the final product. Tilesetters need to be detail oriented when grinding, grouting and finishing as this process will complete the look and enhance the finished product.

Task 15 — Finishes installed product.

Required Knowledge

K 1	float types
K 2	grouting material
K 3	grout floating methods
K 4	setting times
K 5	grout types
K 6	surface absorption rates
K 7	sponge types
K 8	tile finishes
K 9	cleaning compounds
K 10	surrounding finishes
K 11	types of caulking materials
K 12	caulking application methods
K 13	types of sealers

K 14	physical protection of product
K 15	sealant application methods
K 16	how to determine moisture content
K 17	environmental requirements such as temperature and humidity
K 18	TTMAC specifications

Sub-task

F-15.01 Installs grout.

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
NV	yes	yes	yes	yes	yes	ND	yes	yes	yes	ND	ND	ND

Key Competencies

F-15.01.01	select and use tools and equipment such as grout float, margin trowel, buckets, sponges and towels
F-15.01.02	remove contaminants from grout joints
F-15.01.03	float grout over surface ensuring that joints are completely full
F-15.01.04	remove excess grout from surface
F-15.01.05	determine time between applying and cleaning grout based on environmental conditions such as temperature and humidity, and according to manufacturers' specifications
F-15.01.06	wash tiles and shape joints using sponge and water
F-15.01.07	polish or wash surface to remove grout haze if required

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Sub-task

F-15.02 Caulks joints.

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
NV	yes	yes	yes	yes	yes	ND	yes	yes	yes	ND	ND	ND

Key Competencies

F-15.02.01	select and use tools and equipment such as caulking gun and shaping tools
F-15.02.02	select compatible caulking material according to criteria such as usage, colour, location and exposure according to specifications
F-15.02.03	apply and shape caulking material uniformly in required areas

F-15.02.04 install backer rod if required

F-15.02.05 apply primer to surface prior to caulking if required

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Sub-task

F-15.03 Seals material.

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
NV	yes	yes	yes	yes	yes	ND	yes	yes	yes	ND	ND	ND

Key Competencies

F-15.03.01 select and use tools and equipment such as brush, roller, sealant applicator and sponge

F-15.03.02 select sealant according to criteria such as usage, finished look, location, exposure and manufacturers' specification

F-15.03.03 clean surface and allow for drying time

F-15.03.04 apply sealant on grout and tile if required

Task 16 Finishes terrazzo and stone.

Required Knowledge

K 1 types of terrazzo

K 2 types of stone such as marble, granite and limestone and their properties

K 3 grinding methods and materials

K 4 types of binders such as cement and epoxy

K 5 types of pigments

K 6 grout application methods

K 7 types of sealers

K 8 sealant application methods

K 9 TTMAC specifications

Sub-task

F-16.01 **Grinds terrazzo and stone.**

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
NV	yes	no	yes	yes	yes	ND	yes	yes	yes	ND	ND	ND

Key Competencies

F-16.01.01	select and use tools and equipment such as hand grinder, cove base machine, squeegees and floor grinding machine
F-16.01.02	identify grinding requirements according to type of surface
F-16.01.03	select abrasives and oxides according to type of surface
F-16.01.04	cut surface to flatten terrazzo until aggregate and strips are exposed
F-16.01.05	cut stone surface to remove lippage and to flatten surface
F-16.01.06	clean surface to remove sludge
F-16.01.07	polish surface using oxides and final grits

Sub-task

F-16.02 **Grouts terrazzo and stone.**

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
NV	yes	no	yes	yes	yes	ND	yes	yes	yes	ND	ND	ND

Key Competencies

F-16.02.01	select and use tools and equipment such as trowels and floats
F-16.02.02	fill imperfections on surface and joints with grout and/or aggregates
F-16.02.03	identify areas that need additional grinding

Sub-task

F-16.03 Seals terrazzo and stone.

NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
NV	yes	no	yes	yes	yes	ND	yes	yes	yes	ND	ND	ND

Key Competencies

F-16.03.01	select and use tools and equipment such as brush, mops and rollers
F-16.03.02	clean surface thoroughly using cleaning products such as grout haze remover and stone and grout cleaners and according to manufacturers' specifications
F-16.03.03	determine type of sealer to be used according to surface requirements and product suitability
F-16.03.04	apply sealer according to manufacturers' specifications
F-16.03.05	test to identify if additional sealer is necessary
F-16.03.06	buff finished surface if required

APPENDICES

APPENDIX A TOOLS AND EQUIPMENT

Common Tools

broom
bucket
caulking gun
chalk line
chisels
claw hammer
cove base trowel
electrical power bar
extension cords
finishing trowel
floor scraper
grinding stone
grout float
grout scrapers
hacksaw
hand brush
hawk
heavy gauge trowel
lights
magnesium float
margin trowels
marking instruments
masking tape
mitre box
mortar board
notch trowel
plastic sheets
pliers
point trowel
pry bar (crow, glazing, wonder)
putty knife
rags
rubber mallet
screwdrivers
shovel
snips
socket set
sponges
squeegees
straight edge
suction cups
tile cutters
tile nippers
utility knife
vice grips
wheelbarrow
wood float

Measuring and Layout Equipment

builders level
laser (square, line, rotary)
plumb bob
squares
storey pole
straight edges
tape measure
transit
water level

Personal Protective Equipment (PPE) and Safety Equipment

air circulator
air exchanger
caution tape
coveralls (fire retardant)
dust masks
ear plugs and muffs
exhaust fans
eye wash facilities
face shields
fire extinguishers
first aid kit/equipment
full body harness
ground fault interrupters (GFCI)
hard hat
knee pads
leather gloves
life line (lanyard)
portable lighting
respirators
rope grabs
rubber gloves
safety footwear
safety vest
saw guards
signage
vapour masks
warning signs

Scaffolding and Access Equipment

aluminium decks
boom lifts (articulating)
ladder jacks
ladders
pallet jack
ramps
sawhorses
scaffolds (mechanical, stationary, rolling)
scissor-lift

Portable Power Tools and Accessories

angle grinders
base grinder
buffer
chipping hammer
circular saw
core bit drills
drum cement mixer
electric winch
floor grinding machine
floor polisher
floor scrubber
hammer drill
hot glue gun
jack hammer
mixing drill
power chisel
power drill
power grout washing machine
power grouting machine
power scarifier
power undercut saw
router
stand-up screw gun
wet and dry vacuum
wet saw

Speciality Tools and Equipment

air compressor and attachments
cement mixer
communication devices
generator
heaters
jigs (racks)
sealer applicator
stone grinder
stone polisher
terrazzo roller

APPENDIX B GLOSSARY

accessories	fixtures such as towel bars, paper and soap holders
bond coat	material applied to adhere two products together
contaminant	product residue such as adhesive, grease, oil or paint which inhibits bonding
divider strips	zinc, brass or plastic strips used to allow for expansion or contraction of the underbed and topping, or to divide different colour panels or patterns
epoxy	a two-component synthetic thermosetting resinous material
membrane	material used to isolate two components to obtain desired function
mortar bed	mixture of cement and sand placed over a substrate to provide a base for finishing material
scratch coat	first layer of a mortar bed that has a scratched surface
slurry bond coat	wetter version of a bond coat
stone slabs	any natural or engineered material that is 3/4 in. or greater in thickness such as marble, slate, limestone and granite
substrate	the underlying surface such as cement board, wood and concrete, upon which finishing material is placed
terrazzo	a form of mosaic flooring made by embedding aggregate in a matrix
trim	edge protection or finish feature made of materials such as metal, wood, plastic and ceramic

APPENDIX C

ACRONYMS

ANSI	American National Standards Institute
CSA	Canadian Standards Association
LEED	Leadership in Energy and Environmental Design
MSDS	Material Safety Data Sheets
OH&S	Occupational Health and Safety
PPE	Personal protective equipment
TTMAC	Tile, Terrazzo and Marble Association of Canada
VOC	Volatile Organic Compound
WHMIS	Workplace Hazardous Materials Information System

APPENDIX D BLOCK AND TASK WEIGHTING

BLOCK A OCCUPATIONAL SKILLS

	NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU	National Average
%	NV	14	15	14	15	5	ND	5	20	5	ND	ND	ND	12%

Task 1 Performs safety-related functions.

	NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU	
%	NV	50	15	33	20	20	ND	40	50	20	ND	ND	ND	31%

Task 2 Uses and maintains tools and equipment.

	NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU	
%	NV	15	35	38	20	40	ND	45	25	30	ND	ND	ND	31%

Task 3 Organizes work.

	NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU	
%	NV	35	50	29	60	40	ND	15	25	50	ND	ND	ND	38%

BLOCK B SUBSTRATE PREPARATION

	NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU	National Average
%	NV	15	15	17	20	10	ND	5	25	15	ND	ND	ND	15%

Task 4 Removes existing finishes.

	NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU	
%	NV	15	30	23	25	40	ND	20	20	60	ND	ND	ND	29%

Task 5 Evaluates and prepares surface.

	NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU	
%	NV	50	40	46	45	40	ND	70	60	25	ND	ND	ND	47%

Task 6 Installs specialty products.

	NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
%	NV	35	30	31	30	20	ND	10	20	15	ND	ND	ND

24%

BLOCK C LAYOUTS

	NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU	National Average
%	NV	20	10	26	20	20	ND	30	20	25	ND	ND	ND	21%

Task 7 Lays out work area.

	NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
%	NV	80	80	72	70	80	ND	90	70	70	ND	ND	ND

76%

Task 8 Evaluates joints.

	NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
%	NV	20	20	28	30	20	ND	10	30	30	ND	ND	ND

24%

BLOCK D MATERIAL PREPARATION

	NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU	National Average
%	NV	14	15	11	10	20	ND	10	15	15	ND	ND	ND	14%

Task 9 Inspects materials.

	NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
%	NV	10	35	22	20	20	ND	20	20	30	ND	ND	ND

22%

Task 10 Prepares material for installation.

	NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
%	NV	60	35	46	30	40	ND	60	40	30	ND	ND	ND

43%

Task 11 Mixes materials.

	NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
%	NV	30	30	32	50	40	ND	20	40	40	ND	ND	ND

35%

BLOCK E MATERIAL SETTING

	NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU	National Average
%	NV	25	35	21	20	35	ND	25	10	25	ND	ND	ND	24%

Task 12 Installs tiles.

	NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU	
%	NV	70	100	58	45	35	ND	60	30	50	ND	ND	ND	56%

Task 13 Installs stone slabs.

	NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU	
%	NV	25	0	30	30	35	ND	30	35	50	ND	ND	ND	29%

Task 14 Pours terrazzo mixture.

	NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU	
%	NV	5	0	12	25	30	ND	10	35	0	ND	ND	ND	15%

BLOCK F FINISHING

	NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU	National Average
%	NV	12	10	11	15	10	ND	25	10	15	ND	ND	ND	14%

Task 15 Finishes installed product.

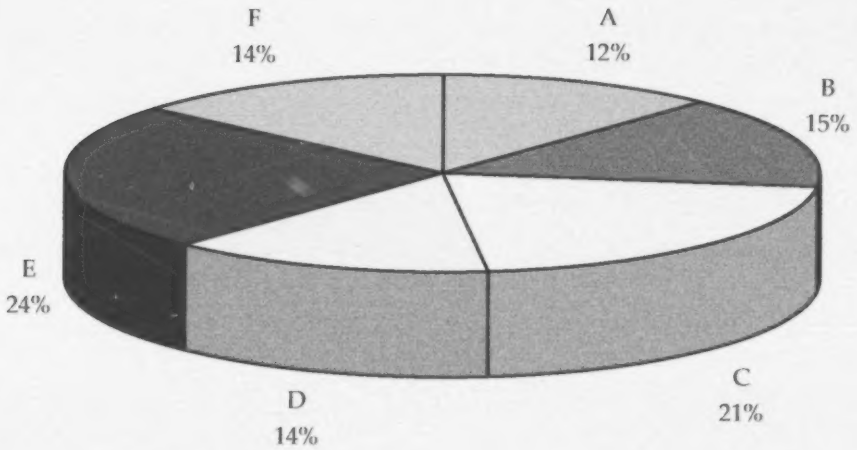
	NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU	
%	NV	75	100	82	60	40	ND	90	40	50	ND	ND	ND	67%

Task 16 Finishes terrazzo and stone.

	NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU	
%	NV	25	0	18	40	60	ND	10	60	50	ND	ND	ND	33%

APPENDIX E

PIE CHART*



TITLES OF BLOCKS

BLOCK A	Occupational Skills	BLOCK D	Material Preparation
BLOCK B	Substrate Preparation	BLOCK E	Material Setting
BLOCK C	Layouts	BLOCK F	Finishing

*Average percentage of the total number of questions on an interprovincial examination, assigned to assess each block of the analysis, as derived from the collective input from workers within the occupation from all areas of Canada. Interprovincial examinations typically have from 100 to 150 multiple-choice questions.

APPENDIX F

TASK PROFILE CHART — Tilesetter

BLOCKS	TASKS	SUB-TASKS			
A - OCCUPATIONAL SKILLS	1. Performs safety-related functions.	1.01 Maintains safe work environment.	1.02 Uses personal protective equipment (PPE) and safety equipment.		
	2. Uses and maintains tools and equipment.	2.01 Maintains tools and equipment.	2.02 Uses access equipment.	2.03 Uses rigging, hoisting and lifting equipment.	
	3. Organizes work.	3.01 Estimates materials, supplies and labour.	3.02 Organizes materials, supplies and work site.	3.03 Evaluates damage or deficiencies.	
B - SUBSTRATE PREPARATION	4. Removes existing finishes.	4.01 Removes surface coverings.	4.02 Cleans surfaces.		
	5. Evaluates and prepares surface.	5.01 Assesses existing substrate.	5.02 Installs membranes.	5.03 Installs mortar beds.	5.04 Installs underlayments.
	6. Installs specialty products.	6.01 Installs sound barrier products.	6.02 Installs in-floor heating.	6.03 Installs engineered products.	
C - LAYOUTS	7. Lays out work area.	7.01 Confirms site measurements.	7.02 Determines tile layout for best visual effect.	7.03 Lays out grid lines.	7.04 Evaluates rise and run of stairs.
	8. Evaluates joints.	8.01 Accommodates existing joints.	8.02 Determines additional joint requirements.		
D - MATERIAL PREPARATION	9. Inspects materials.	9.01 Confirms material consistencies.	9.02 Checks for damage.		

BLOCKS	TASKS	SUB-TASKS				
	10. Prepares material for installation.	10.01 Prepares tile.	10.02 Prepares stone slabs.			
	11. Mixes materials.	11.01 Mixes material for tile and stone.	11.02 Mixes mortar beds.	11.03 Mixes terrazzo.		
E - MATERIAL SETTING	12. Installs tiles.	12.01 Applies setting material.	12.02 Sets tiles.	12.03 Installs accessories.	12.04 Installs expansion and control joints.	12.05 Installs tile trim.
	13. Installs stone slabs.	13.01 Installs anchors.	13.02 Applies stone slab setting material.	13.03 Mounts stone slabs.	13.04 Sets stone slabs.	
	14. Pours terrazzo mixture.	14.01 Installs divider strips for terrazzo.	14.02 Applies bond coat.	14.03 Trowels in terrazzo mixture.	14.04 Works surface.	
F - FINISHING	15. Finishes installed product.	15.01 Installs grout.	15.02 Caulks joints.	15.03 Seals material.		
	16. Finishes terrazzo and stone.	16.01 Grinds terrazzo and stone.	16.02 Grouts terrazzo and stone.	16.03 Seals terrazzo and stone.		